37. (New) The method as claimed in claim 1, wherein data indicating the time at which each virtual container was generated relative to other associated virtual containers is provided by a sequence marker for each virtual container, and wherein the maximum differential delay expected between virtual containers at a destination in said synchronous digital network determines the number of frames over which a sequence marker must increment before it is repeated, the sequence marker being incremented every 2N+ 1 frames wherein N is the number of frames generated in a time equivalent to the maximum differential delay.

Remarks

Claims 1, 13, 14, 22, 26, 29 have been amended to clearly indicate that as virtually concatenated virtual containers may be routed over a plurality of different paths in a network, parallel streams of virtual containers may experience differential delay. Accordingly, there is a need to indicate the sequence of the virtual containers themselves relative to each other. There is support in the specification and claims as filed for the amendments made and so added matter is not an issue.

Regarding the Examiner's comments concerning the relevance of Huang (US 6, 266, 345) and the rejections of all claims under 35 U.S.C. §§ 102 and 103,the applicants wish to state the following:

Firstly, regarding the relevance of Huang under 35 USC § 102(e) regarding claims 1-3, 5 -14, 16-22, and 28-29, Huang does not contemplate the problems associated with the differential delay of diversely routed virtual containers. Huang describes in Col. 6, lines 44 to 51 that "the network management of the first system assigns a pointer for each virtual channel (a term equivalent in Huang to a virtual container for an SDH network) that points to a value. The values indicate an order in which the segmented data stored in the payload of each virtual channel (container) should be reassembled".

Secondly, Huang teaches that the allocation of virtual containers involves determining a bit rate of the data and determining a number and identity of virtual containers to use to transmit data (see Col. 2, lines 54 to 67 of Huang). However, Huang teaches that the virtual containers are concatenated so that the phase relationships of each container is fixed.

Accordingly, Huang does not contemplate differential delay which may distort the fixed phase relationships of the containers. The present invention relates to virtually concatenating virtual containers over a plurality of data streams which may be diversely routed across a network such that the underlying network is unaware of any special relationship between the virtual containers which make up the group of associated virtual containers.

Thus, the invention clearly contemplates virtually concatenated virtual containers taking different routes across the network and that a differential delay may result. The amended claims 1, 13, 14, 22, 26, and 29 now indicate that a value indicating the time at which each virtual container was generated is also provided for each virtual container. This data enables the correct sequence of virtual containers to be reconstructed at the destination node.

Moreover, Huang does not teach the use of providing sequence markers in virtual containers which are provided using at least one bit from a plurality of associated virtual containers, such as new claim 32 indicates. The use of at least one bit from a plurality of associated virtual containers advantageously enables very long delays to be indicated by the sequence marker.

Regarding the relevance of Huang under 35 USC § 103 in combination with Okasan et al (US 5666351) for claims 4, 15, 23, and 27, the Applicants remain mute in view of the above arguments submitted regarding the irrelevance of Huang under 35 USC § 102(e) regarding claims 1-3, 5 -14, 16-22, and 28-29.

The Applicants also note the remaining prior art cited by the Examiner in paragraph 5 of the Office Action, but believe it does not prejudice the patentability of this invention in view of the comments submitted above regarding the patentability of the new and amended claims.

Favorable reconsideration is therefore solicited.

November 11, 2002

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Marked Up Version showing Amendments

1. (Amended) A method of transporting data over a synchronous digital network, said method comprising the steps of:

generating in parallel a plurality of synchronous virtual containers, each at a lower bit rate than a bit rate of said data, each said virtual container having a payload section;

associating said plurality of virtual containers with each other by means of assigning association data describing said association into said plurality of virtual containers;

indicating for each virtual container the time at which each virtual container was generated relative to other associated virtual containers;

inputting said transported data into said payloads of said plurality of virtual containers; and

outputting said plurality of associated virtual containers onto a synchronous digital network.

13. (Amended) Apparatus for incorporating data input at a first data rate into a plurality of streams of synchronous digital hierarchy virtual containers each output at a second data rate, said apparatus comprising:

means for continuously generating a plurality of virtual containers in parallel;

means for generating data describing an association of said plurality of virtual containers, and for assigning said association data to said plurality of associated virtual containers; and

means for inserting said first data rate data into said plurality of payloads of said plurality of virtual containers,

wherein said data describing said association includes data indicating for each virtual container the time at which each virtual container was generated relative to other associated virtual containers.

14. (Amended) A method of recovering data from a plurality of synchronous virtual containers, said method comprising the steps of:

receiving said plurality of virtual containers;

identifying an association data from said plurality of virtual containers, said association data indicating an association between individual ones of said plurality of virtual containers;

reading data bytes from each payload of said plurality of associated virtual containers; and

re-assembling said data from said plurality of read payload data bytes,

wherein said association data includes data indicating for each virtual container the time at which each virtual container was generated relative to other associated virtual containers.

22. (Amended) A method of recovering data carried in payloads of a plurality of associated synchronous digital hierarchy virtual containers, said method comprising the steps of:

for each said virtual container:

reading data indicating an association between said virtual container and other ones of said plurality of virtual containers;

allocating a memory storage area for storing a payload of said virtual container;

inputting said virtual container payload into said memory area; and

reading said data from said memory area in parallel with data read from other said memory areas corresponding to payloads of other said virtual containers of said plurality of virtual containers;

wherein said data indicating said association includes data indicating for each virtual container the time at which each virtual container was generated relative to other associated virtual containers.

26. (Amended) A method of recovering a data block carried in a plurality of payloads of a plurality of associated synchronous digital hierarchy virtual containers, said method comprising steps of:

receiving a plurality of streams of said plurality of associated virtual containers;

for each said received virtual container stream allocating a corresponding respective memory area for storage of data payloads of virtual containers of said stream;

synchronising each virtual container in the received virtual container stream with virtual containers received in other streams to remove any differential delay between virtual container streams;

storing said plurality of virtual container payloads in said corresponding allocated memory areas; and

reading individual bytes of said plurality of stored virtual container data payloads in sequence to reconstruct said data block.

29. (Amended) Apparatus for recovering data from a plurality of synchronous digital hierarchy virtual containers containing said data, said means comprising:

a random access memory configured into a plurality of individual memory areas allocated for storage of payloads of said plurality of virtual containers;

a data processor means operating to identify an association data of said virtual containers, said association data indicating an association of said plurality of virtual containers; and

means for generating a plurality of read pointers operating to successively read a plurality of memory locations of said memory areas for recovering said data from said plurality of virtual containers, wherein said association data includes data indicating for each virtual container the time at which each virtual container was generated relative to other associated virtual containers.